

## Air Force develops upgrade to helicopter CZAR fleet; systems developed by Sensors directorate incorporated

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STRATFORD, CONN. - Air Force personnel had their first look at the future of combat search and rescue when a new, upgraded HH-60G Pave Hawk helicopter was unveiled at Sikorsky Aircraft's facility in Stratford, Conn., April 29.

The Block 152 upgrade, formally known as Upgraded Communication, Navigation/Integrated Electronic Warfare, or UCN/IEW, is the most significant upgrade ever for the Pave Hawk. The upgrades are designed to greatly enhance the aircraft's performance in locating and retrieving downed pilots from hostile territory. The program is managed by Aeronautical Systems Center at Wright-Patterson AFB, Ohio. The combined government team includes ASC, Warner Robins Air Logistics Center and Air Combat Command.

New features include an enhanced communication and

navigation system, and an electronic warfare suite that dispenses countermeasures to thwart missile and radar threats. These systems are integrated into a 1553 computer data bus designed to greatly reduce aircrew workload. The 1553 data bus concept was developed at Wright-Patterson AFB in the late 1970s by Air Force personnel in the Avionics Laboratory, now Sensors directorate of Air Force Research Laboratory. The aircraft also features a new, external, gun-mount system that supports a .50 caliber machine gun in addition to the current, 7.62-mm minigun and M240 gun.

The prototype helicopter will undergo contractor test flights later this month at Stratford, and at the end of June will begin six months of testing with the Air Force. Air Force developmental test and evaluation will be with

Detachment 1, Hurlburt Air Force Base, Fla., and operational test and evaluation is scheduled with the 422nd Test and Evaluation Squadron at Nellis Air Force Base, Nev. After certification of the upgrade, a contract will be issued to retrofit 48 more aircraft, scheduled to be completed by 2007.

Personnel from the 422nd also were heavily involved in drafting the requirements for the modification program. "We got this helicopter modification from two sources," said Col. George Monroe, ACC director of requirements. "One is from the actual combat experience we had in Desert Storm, since then in the desert, and in Bosnia. The second is from tough combat testing in the harsh desert north of Las Vegas."



**LET US INTRODUCE** - The future of combat search and rescue, the upgraded Pave Hawk includes the latest communication and navigation systems, a relocated radar turret, externally mounted guns and that support a .50-caliber machine gun, chaff and flare buckets, and an electronic warfare suite.

"We've been very involved in the entire design process, but this is my first opportunity to see it," Capt. Mike Geragosian, a pilot with the 422nd said. "It's very impressive. It's the most advanced search-and-rescue helicopter that's out there."

"It increases our capabilities in the threat environment and, by integrating all of the radios, it reduces workload in the cockpit so we can concentrate on the important things like looking outside and flying."

"The acquisition program had some big changes since the start-up three years ago," said Lt. Col. Mike Quinn, ASC Helicopter Integrated Product Team leader and UCN/IEW program manager. "It started out as a minor mod, fitting the new stuff in available space, but ended up as a major mod with the relocation of almost every avionics unit."

All of the communications and navigation information on the new aircraft is available on a single, control display unit. "This prevents clutter in the cockpit—all the independent radio control heads—and yet still gives pilots the speed and access they would like to have in a single, radio-control configuration," Quinn said.

The system provides the latest, secure-satellite communications features, as well as maritime and commercial frequencies, increasing flexibility to act with sister services and civil authorities, he said. "In the past, when we were tasked to support a civil rescue operation, messages had to be relayed between Air Force personnel and police officials. Now we can talk directly to them."

Another modification to the helicopter is the relocation of the forward-looking, infrared radar turret, or FLIR, from an area that was below the nose and slightly to the left of the centerline, to an area on the nose that is higher off the ground along the centerline of the aircraft.

"This was primarily a maintenance-driven requirement," Quinn said. "These aircraft have to land in unimproved areas, and there was a problem with these costly turrets being crushed, so the idea was to move it up and forward."

Guns on the modified Pave Hawk are mounted externally, instead of being hinged to swing inside the cabin to lock in place. This provides flight engineers, who operate the aircraft's weapons, with the advantage of closing the gunner's windows when flying in subzero temperatures, and frees up cabin space. The guns lock in a fixed, forward-firing position. In this configuration, the capability exists for pilots to operate the weapons.

"After the preliminary requirement (for externally

mounted guns) was done, I did some research and looked at what the Army and Navy were doing in this area," said Tech. Sgt. Ronney Isham, 422 TES flight engineer. "They weren't doing anything in this area, so we worked closely with the contractor and together we came up with a new design."

The new mounts provide a weapon system that is completely external, to include the ammunition cans. The new system supports operation of a .50 caliber machine gun. Previously, the big gun only could be operated from the open door of the aircraft.

As another defensive measure, the new Pave Hawks will come equipped with electronic countermeasures that detect enemy radar and missile threats. The aircraft is designed to dispense flare and chaff automatically when these threats are detected. These flare-and-chaff buckets, never operationally certified before on any combat search-and-rescue helicopter, can operate in an automatic, semi-automatic or manual mode.

The communications, navigation and electronic warfare systems are integrated into an additional 1553 data bus. All of the aircraft's avionics, communications, navigation and electronic warfare systems fit into two, floor-to-ceiling racks immediately behind the cockpit, next to the flight engineer and gunners' stations. The placement of these racks came as the result of a solution to a problem the team encountered when designing the new features.

Originally the equipment was to be placed in the aft section of the aircraft. However, the weight of racks created a 400-pound, center-of-gravity problem. Placing two racks forward was the solution; moving the FLIR turret forward, also helped solve, unintentionally, the center-of-gravity problem. The placement of the equipment racks increases the overall cabin space.

The racks are "line-replaceable units." Equipment can be removed from the racks for repair and replaced within an hour. The racks provide room for future growth should additional equipment be added at a later date. The system also is designed to take advantage of the heat generated by the avionics systems in the racks. Warm air can be vented outside in hot weather, and inside in cool weather.

Other important additions to the helicopter include a voice warning system; a multi-mission, adaptive tactical terminal, which provides crewmembers with real-time, off-board intelligence; system data loading with either 3.5 inch diskettes or flash memory "cards;" and improved Night Vision Goggles and NVG compatible displays. @